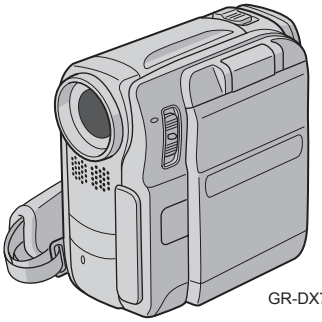
JVC

SERVICE MANUAL

DIGITAL VIDEO CAMERA

GR-DX77US,GR-DX97US



Mini DV NTSC

DSC DIGITAL STILL CAMERA

GR-DX77US[M4D3S7], GR-DX97US[M4D3M7]

For disassembling and assembling of MECHANISM ASSEMBLY, refer to the SERVICE MANUAL No.86700(MECHANISM ASSEMBLY).

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No.YF031
2004/3

SPECIFICATION

Camcorder

For General

Power supply
DC 11 V (Using AC Adapter)
DC 7.2 V (Using battery pack)
Power consumption
Approx. 3.1 W (3.8W*) (LCD monitor off, viewfinder on)
Approx. 3.9 W (4.6W*) (LCD monitor on, viewfinder off)
Approx. 6.4 W (Maximum; when charging a battery)
* Using LED Light
Dimensions (W x H x D)
52 mm x 93 mm x 94 mm
(2-1/16" x 3-11/16" x 3-3/4") (with the LCD monitor closed and the viewfinder pushed back in)
Weight
Approx. 435 g (0.96 lbs)
(without battery, cassette, memory card, lens cap and grip strap)
Approx. 510 g (1.2 lbs)
(incl. battery, cassette, memory card, lens cap and grip strap)
Operating temperature
0°C to 40°C (32°F to 104°F)
Operating humidity
35% to 80%
Storage temperature
–20°C to 50°C (–4°F to 122°F)
Pickup
1/6" CCD
Lens
F 1.2, f = 2.6 mm to 31.2 mm, 12:1 power zoom lens
Filter diameter
ø27 mm
LCD monitor
3.0"*/2.5"** diagonally measured, LCD panel/TFT active matrix system
* GR-DX97
** GR-DX77
Viewfinder
Electronic viewfinder with 0.3" color LCD
Speaker
Monaural
LED Light
Effective distance: 1.5 m (5 ft)

For Digital Video Camera

Format
DV format (SD mode)
Signal format
NTSC standard
Recording/Playback format
Video: Digital component recording
Audio: PCM digital recording, 32 kHz 4-channel (12-BIT), 48 kHz 2-channel (16-BIT)
Cassette
Mini DV cassette
Tape speed
SP: 18.8 mm/s, LP: 12.5 mm/s
Maximum recording time (using 80 min. cassette)
SP: 80 min., LP: 120 min.

For Digital Still Camera

Storage media
SD Memory Card/MultiMediaCard
Compression system
Still image: JPEG (compatible)
Moving image: MPEG4 (compatible)
File size
Still image:
2 modes (1024 x 768 pixels/640 x 480 pixels)
Moving image:
1 mode (160 x 120 pixels)
Picture quality
2 modes (FINE/STANDARD)
Approximate number of storable images
☞ pg. 21

For Connectors

AV
S-Video input:
Y: 0.8 V to 1.2 V (p-p), 75 Ω, analog
C: 0.2 V to 0.4 V (p-p), 75 Ω, analog
S-Video output:
Y: 1.0 V (p-p), 75 Ω, analog
C: 0.29 V (p-p), 75 Ω, analog
Video input: 0.8 V to 1.2 V (p-p), 75 Ω, analog
Video output: 1.0 V (p-p), 75 Ω, analog
Audio input: 300 mV (rms), 50 kΩ, analog, stereo
Audio output: 300 mV (rms), 1 kΩ, analog, stereo
Edit: ø3.5 mm, 2-pole
Microphone input
ø3.5 mm, stereo
DV
Input/output: 4-pin, IEEE 1394 compliant
USB
5-pin

AC Adapter

Power requirement
AC 110 V to 240 V~, 50 Hz/60 Hz
Output
DC 11 V ⎓, 1 A

Specifications shown are for SP mode unless otherwise indicated. E & O.E. Design and specifications subject to change without notice.

SECTION 1
PRECAUTIONS

1.1 SAFTY PRECAUTIONS

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold.However,in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

1.1.1 Precautions during Servicing

(1) Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product.When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

(2) Parts identified by the ⚠symbol and shaded ( ) parts are critical for safety.
Replace only with specified part numbers.

NOTE :
Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

(3) Fuse replacement caution notice.
Caution for continued protection against fire hazard.
Replace only with same type and rated fuse(s) as specified.

(4) Use specified internal wiring. Note especially:
- Wires covered with PVC tubing
- Double insulated wires
- High voltage leads

(5) Use specified insulating materials for hazardous live parts. Note especially:
- Insulation Tape
- PVC tubing
- Spacers
- Insulation sheets for transistors
- Barrier

(6) When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

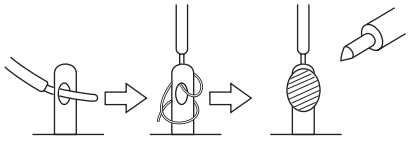


Fig.1-1-1

(7) Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

(8) Check that replaced wires do not contact sharp edged or pointed parts.

(9) When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

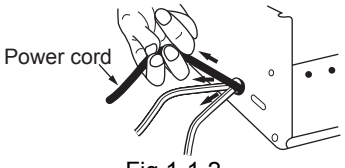


Fig.1-1-2

(10) Also check areas surrounding repaired locations.

(11) Products using cathode ray tubes (CRTs)In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits.Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

(12) Crimp type wire connectorIn such cases as when replacing the power transformer in sets where the connections between the power cord and power trans former primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
- **Connector part number** :E03830-001
- **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
- **Replacement procedure**

a) Remove the old connector by cutting the wires at a point close to the connector.Important : Do not reuse a connector (discard it).

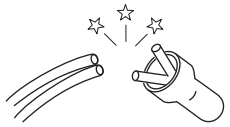


Fig.1-1-3

b) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

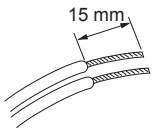


Fig.1-1-4

c) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

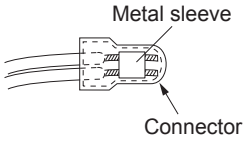


Fig.1-1-5

d) As shown in Fig.1-1-6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

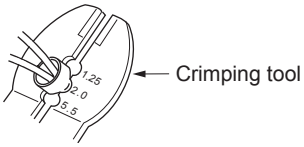


Fig.1-1-6

e) Check the four points noted in Fig.1-1-7.

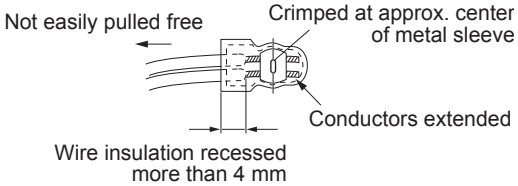

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig.1-1-7

1.1.2 Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

(1) Insulation resistance test
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).See table 1 below.

(2) Dielectric strength test
Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See Fig.1-1-11 below.

(3) Clearance distance
When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See Fig.1-1-11 below.

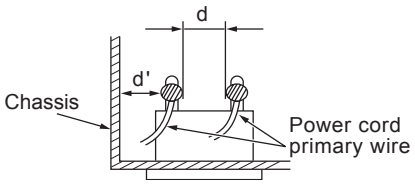


Fig.1-1-8

(4) Leakage current test
Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).
Measuring Method : (Power ON)Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See Fig.1-1-9 and following Fig.1-1-12.

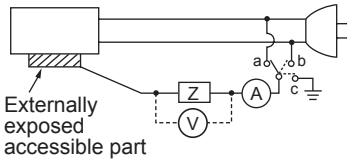
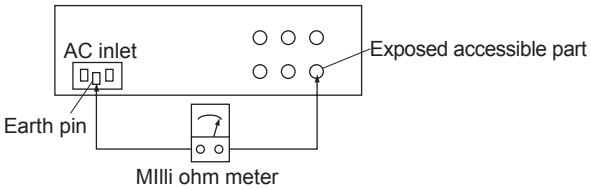


Fig.1-1-9

(5) Grounding (Class 1 model only)
Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).Measuring Method:
Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See Fig.1-1-10 and grounding specifications.



Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

Fig.1-1-10

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	1 MΩ ≦R≦ 12 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R≧ 10 MΩ/500 V DC	AC 3 kV 1 minute (Class Ⅱ) AC 1.5 kV 1 minute (Class Ⅰ)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Fig.1-1-11

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Fig.1-1-12

NOTE :

These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

SECTION 2
SPECIFIC SERVICE INSTRUCTIONS

The following table indicate main different points between models GR-DX77US and GR-DX97US

MODEL	GR-DX77US	GR-DX97US
LCD MONITOR	2.5INCH	3.0INCH
MEMORY CARD	YES(Option)	YES(MMC8MB)

SECTION 3
DISASSEMBLY

3.1 BEFORE ASSEMBLY AND DISASSEMBLY

3.1.1 Precautions

- Be sure to disconnect the power supply unit prior to mounting and soldering of parts.
- Prior to removing a component part that needs to disconnect its connector(s) and its screw(s), first disconnect the wire(s) from the connector(s), and then remove the screw(s).
- When connecting/disconnecting wires, pay enough attention not to damage the connectors.
- When inserting the flat wire to the connector, pay attention to the direction of the flat wire.
- Be careful in removing the parts to which some spacer or shield is attached for reinforcement or insulation.
- When replacing chip parts (especially IC parts), first remove the solder completely to prevent peeling of the pattern.
- Tighten screws properly during the procedures. Unless specified otherwise, tighten screws at a torque of 0.118N·m (1.2kgf·cm). However, 0.118N·m (1.2kgf·cm) is a value at the time of production. At the time of service, perform the procedure at a torque 10% less than 0.118N·m (1.2kgf·cm). (See "SERVICE NOTE" as for tightening torque.)

3.1.2 Destination of connectors

Two kinds of double-arrows in connection tables respectively show kinds of connector/wires.

⇔ : Flat wire ↔ : Wire ⬌ : Board to board (B-B)
: The connector of the side to remove

CONN. No.	CONNECTOR					PIN No.
CN2a	MAIN	CN101	⇔	MONI BW	CN761	40
CN2b	MAIN	CN103	⇔	MINI BW	CN762	10

3.1.3 Disconnection of connectors (Wires)

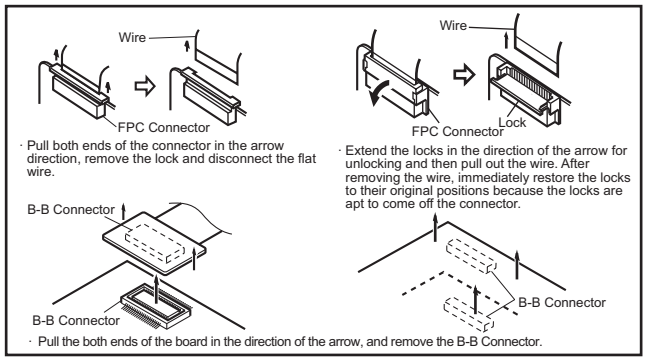

Wire
FPC Connector
· Pull both ends of the connector in the arrow direction, remove the lock and disconnect the flat wire.
Wire
FPC Connector
Lock
· Extend the locks in the direction of the arrow for unlocking and then pull out the wire. After removing the wire, immediately restore the locks to their original positions because the locks are apt to come off the connector.
B-B Connector
B-B Connector
B-B Connector
· Pull the both ends of the board in the direction of the arrow, and remove the B-B Connector.

Fig.3-1-1

3.1.4 Tools required for disassembly and assembly

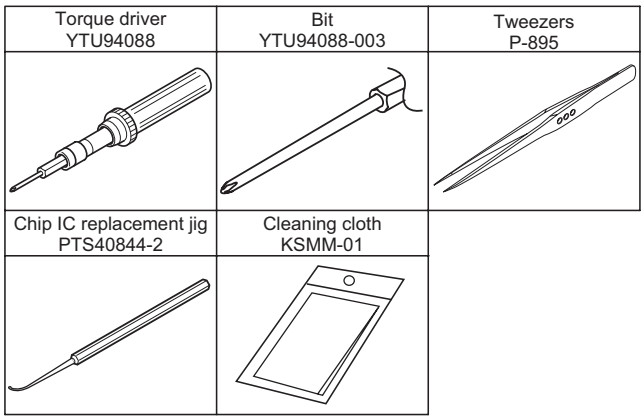


Fig.3-1-2

- **Torque driver**
  Be sure to use to fastening the mechanism and exterior parts because those parts must strictly be controlled for tightening torque.
- **Bit**
  This bit is slightly longer than those set in conventional torque drivers.
- **Tweezers**
  To be used for removing and installing parts and wires.
- **Chip IC replacement jig**
  To be used for replacement of IC.
- **Cleaning cloth**
  Recommended cleaning cloth to wipe down the video heads, mechanism (tape transport system), optical lens surface.

3.2 ASSEMBLY AND DISASSEMBLY OF MAIN PARTS

3.2.1 Assembly and disassembly

When reassembling, perform the step(s) in reverse order.

STEP No.	PART	Fig. No.	POINT	NOTE
[1]	TOP COVER ASSY	Fig.C1	4(S1a), 3(L1a),CN1a	-
[2]	UPPER ASSY (Inc. VF ASSY, SPEAKER/MONITOR)	Fig.C2-1	(S2a),2(S2b),3(S2c) 2(SD1a), L2,CN2a,b	-
[8]	E.VF UNIT(B/W)	Fig.C2-2	2(S8),L8,CN8a	NOTE 8
(∗1)	(∗2)	(∗3)	(∗4)	(∗5)

(∗1) Order of steps in Procedure
When reassembling, preform the step(s) in the reverseorder. These numbers are also used as the identification (location) No. of parts Figures.
(∗2) Part to be removed or installed.
(∗3) Fig. No. showing Procedure or Part Location.
C = CABINET
(∗4) Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped or unsoldered.
S = Screw
L = Lock, Release, Hook
SD = Solder
CN = Connector

[Example]

- 4 (S1a) = Remove 4 S1a screws.
- 3 (L1a) = Disengage 3 L1a hooks.
- 2 (SD1a) = Unsolder 2 SD1a points.
- CN1a = Remove a CN1a connector.

(∗5) Adjustment information for installation.

3.2.2 ASSEMBLY/DISASSEMBLY OF CABINET PARTS AND ELECTRICAL PARTS

●Disassembly procedure

STEP No.	PART NAME	Fig. No.	POINT	NOTE
[1]	CASSETTE COVER ASSY	Fig.C1	GRIP BELT ASSY,2(S1),HOOK(F) (S1),L1a,COVER(ADJ),4(S1),L1b	NOTE1
[2]	SIDE COVER(R)	Fig.C2	(S2a),(S2b),L2a,L2b	-
[3]	TOP COVER		2(S3),2(L3)	-
[4]	SIDE COVER(L)ASSY	Fig.C3	6(S4a),(S4b),(S4c),COVER(DV)ASSY JACK COVER ASSY	NOTE4a, b
[5]	UPPER CASE ASSY	Fig.C4	(S5),L5,COVER(JIG CON),4(S5),CN5	NOTE5
[6]	FRONT COVER ASSY	Fig.C5	5(S6),CN6	NOTE6
[7]	MIC ASSY		2(S7)	NOTE7
[8]	REAR COVER ASSY	Fig.C6	2(S8),3(L8),CN8	NOTE8
[9]	MONITOR BOARD	Fig.C7	2(S9),3(L9a),BKT(TOP)ASSY CN9a,b,6(S9),L9b,2(L9c)	NOTE9
[10]	SD BOARD ASSY	Fig.C8	CN10,(S10)	-
[11]	LOWER UNIT ASSY (INCLUDE VF ASSY/OP BLOCK ASSY)		CN11a,b,c,d,e,3(S11)	-
[12]	VF ASSY	Fig.C9	4(S12)	NOTE12a, b
[13]	OP BLOCK ASSY/CCD BOARD ASSY		(S13a),2(S13b),2(L13)	NOTE13
[14]	MAIN BOARD ASSY	Fig.C10	2(S14),2(L14a),SHIELD COVER CN14a,b,c,L14b	NOTE14
[15]	MDA BOARD ASSY	Fig.C11	CN15a,b,c,d,2(S15)	-
[16]	MECHANISM ASSY		(S16a),BKT(PRE-REC),3(S16b) BKT(MECHA)ASSY	NOTE16

NOTE1:
Before removing the CASSETTE COVER ASSEMBLY, remove the GRIP BELT ASSEMBLY.

NOTE4a:
During the procedure, be careful in handling the parts.

NOTE4b:
In attaching the SIDE COVER (L) ASSEMBLY, attach the COVER (JACK, DV) ASSEMBLY at the same time.

NOTE5:
In removing the UPPER CASE ASSEMBLY, be careful not to damage connectors.

NOTE6:
In attaching the FRONT COVER ASSEMBLY, be careful not to cut or damage wires.

NOTE7:
In attaching the MIC ASSEMBLY, be careful not to cut or damage wires.

NOTE8:
When attaching the REAR COVER ASSEMBLY, be careful about the position of switch.

NOTE9:
For the disassembly procedure of the MONITOR ASSEMBLY, see "3.2.3 DISASSEMBLY of [9] MONITOR ASSEMBLY"

NOTE12a:
Pull out the VF ASSEMBLY, and remove one screw (No.46).

NOTE12b:
For the disassembly procedure of the VF ASSEMBLY, see "3.2.4 DISASSMBLY of [12] VF ASSEMBLY"

NOTE13:
For the disassembly procedure of the OP BLOCK ASSEMBLY/CCD BOARD ASSEMBLY, see "3.2.5 DISASSEMBLY of [13] OP BLOCK ASSEMBLY/CCD BOARD ASSEMBLY"

NOTE14:
In removing the MAIN BOARD ASSEMBLY, remove the SPACER.

NOTE16:
Be careful in handling the parts.

●Destination of connectors

CN.NO.	CONNECTOR					PIN NO.
CN5	MAIN	CN115	⇔	SUB OPE UNIT	-	6
CN6	MAIN	CN111	⇔	MIC ASSY	-	4
CN8	MAIN	CN109	⇔	CAMERA OPE UNIT	-	13
CN9a	MAIN	CN104	⇔	MONITOR	CN7601 /CN7602	39/20, 20
CN9b	MAIN	CN108	⇔	POWER OPE UNIT	-	7
CN10	MAIN	CN114	⇔	SD	CN701	12
CN11a	MAIN	CN112	⇔	FRONT	CN401	12
CN11b	MAIN	CN107	⇔	OP BLOCK ASSY	-	28
CN11c	MAIN	CN102	⇔	CCD	CN5501	20
CN11d	MAIN	CN101	⇔	BATT. TERM.	-	21
CN11e	MAIN	CN113	⇔	VF FPC ASSY	-	22/20
CN14a	MAIN	CN106	⇔	SENSOR	-	16
CN14b	MAIN	CN103	⇔	MDA	CN305	30
CN14c	MAIN	CN110	⇔	HEAD	-	8
CN15a	MDA	CN301	⇔	CAPSTAN MOTOR	-	18
CN15b	MDA	CN302	⇔	DRUM MOTOR	-	11
CN15c	MDA	CN303	⇔	ROTARY ENCODER SW	-	6
CN15d	MDA	CN304	⇔	LOADING MOTOR	-	6

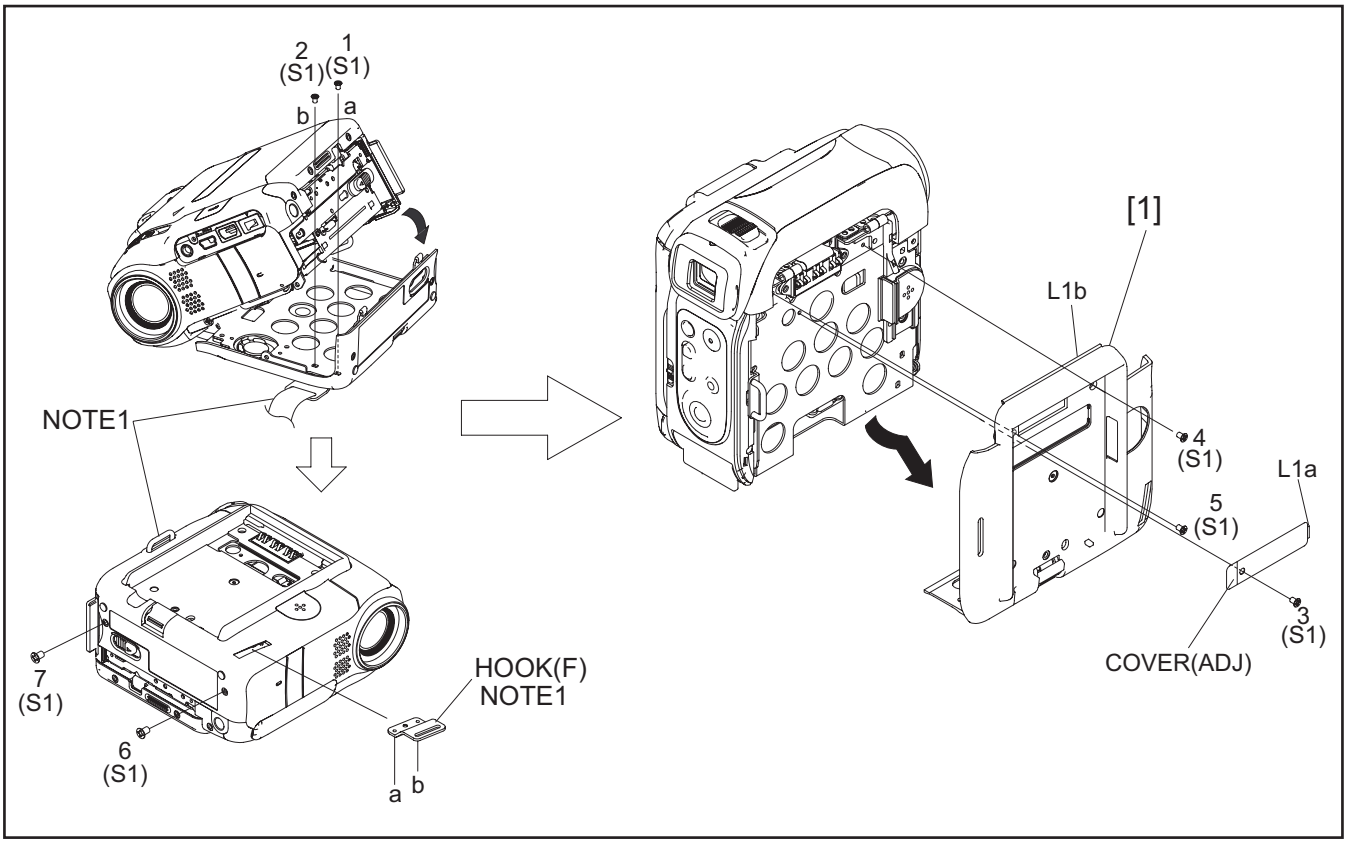


Fig.C1

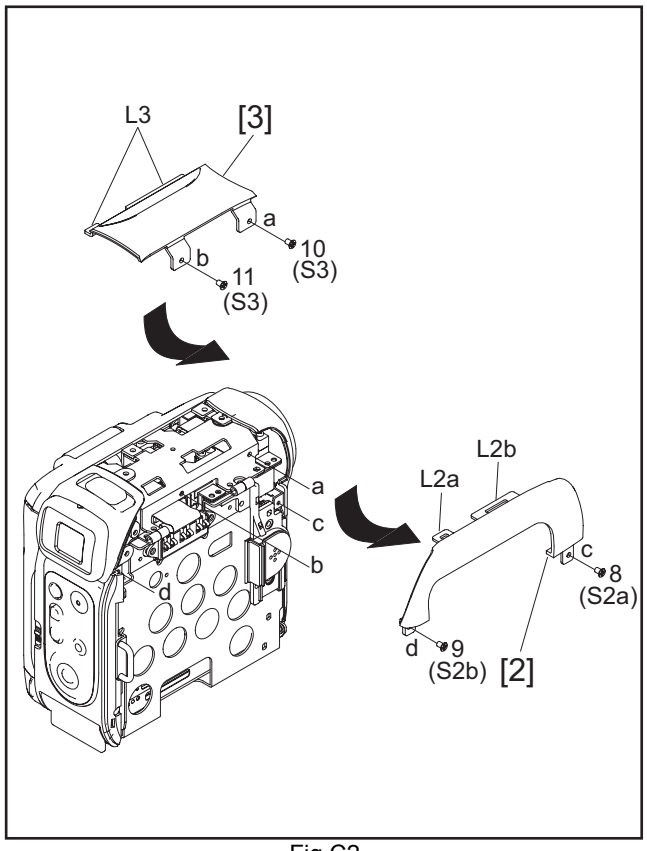


Fig.C2

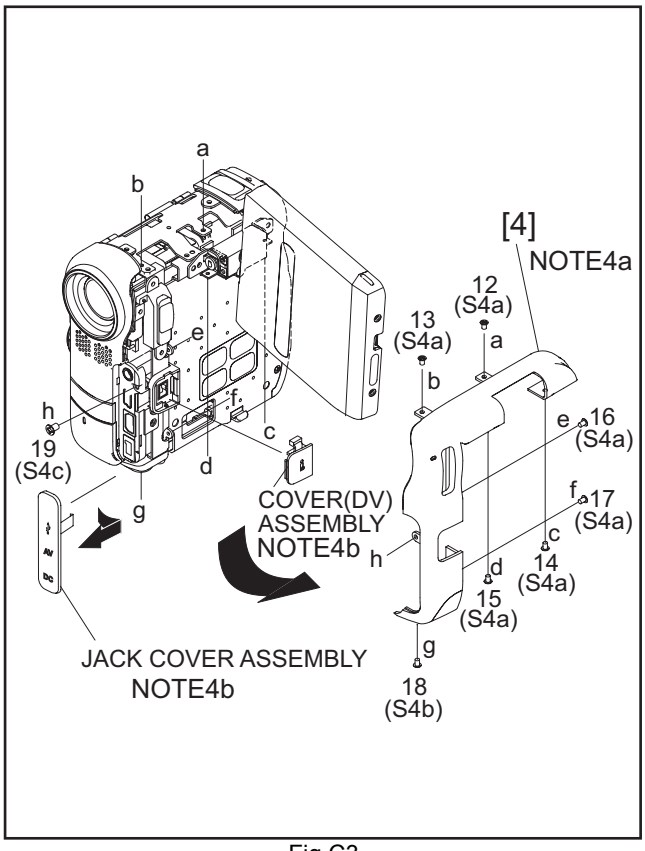


Fig.C3

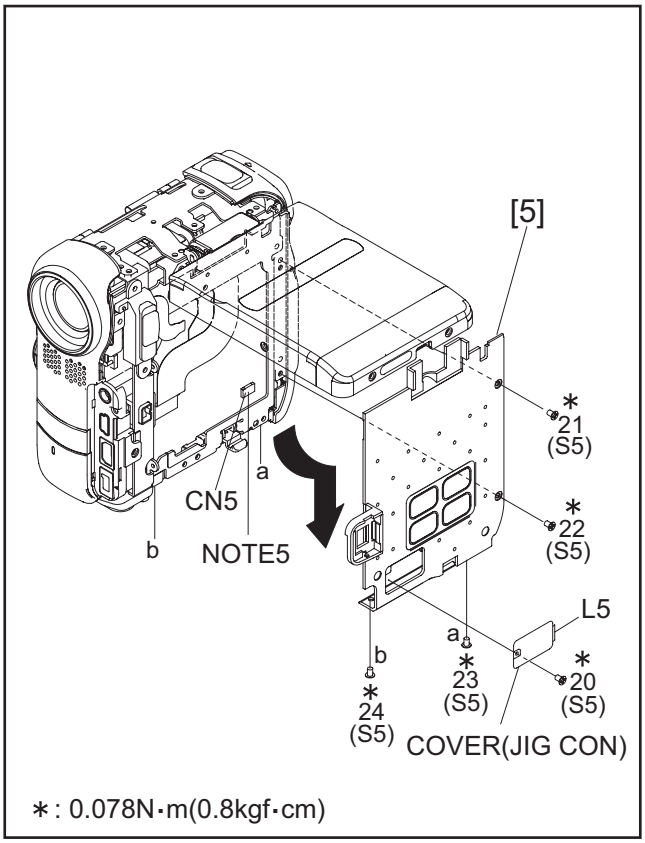

[5]
21
(S5)
22
(S5)
CN5
a
b
NOTE5
L5
a
b
23
(S5)
20
(S5)
24
(S5)
COVER(JIG CON)
∗: 0.078N･m(0.8kgf･cm)

Fig.C4

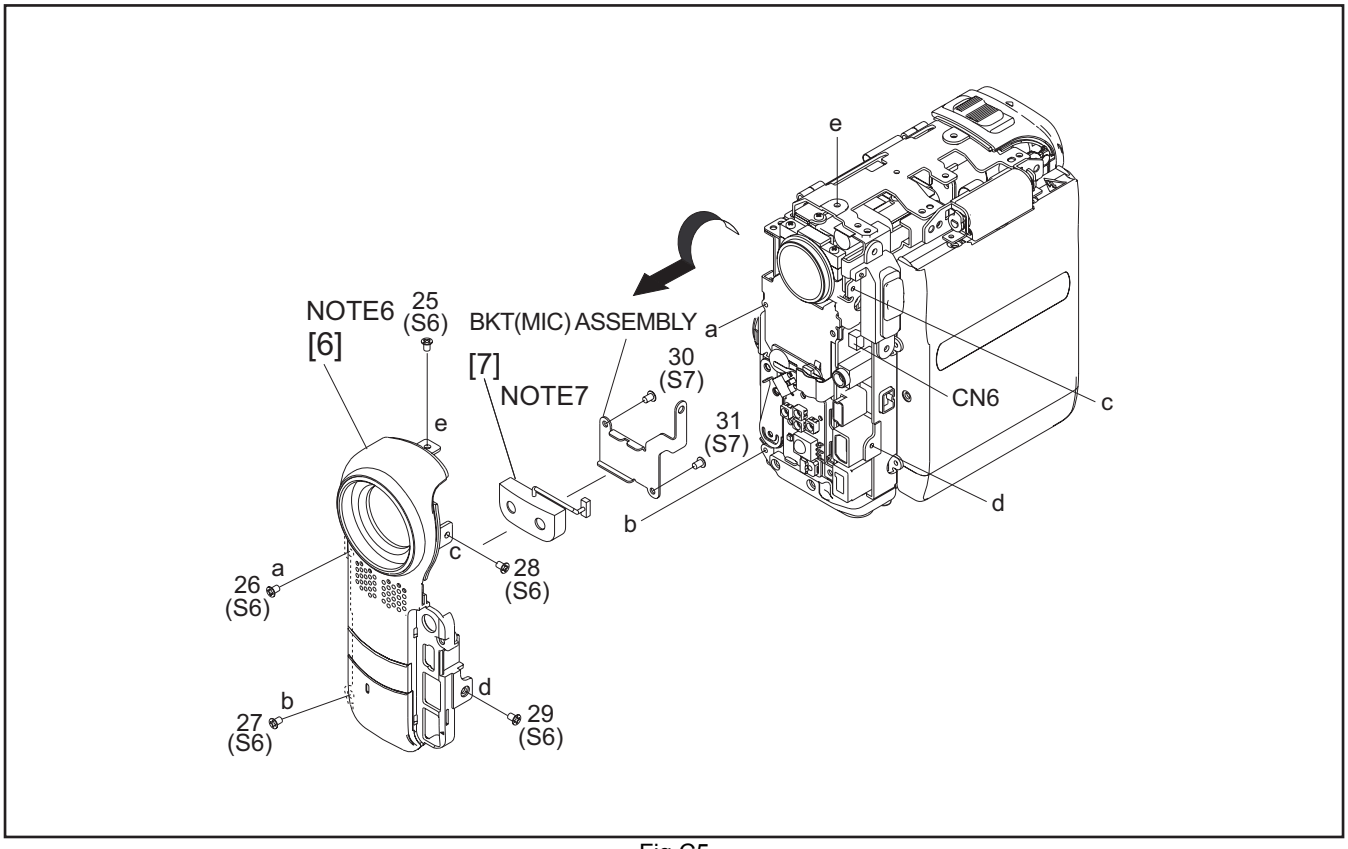

e
NOTE6
25
(S6)
BKT(MIC) ASSEMBLY
a
[6]
[7]
NOTE7
30
(S7)
CN6
c
31
(S7)
e
d
b
c
a
26
(S6)
28
(S6)
b
d
27
(S6)
29
(S6)

Fig.C5

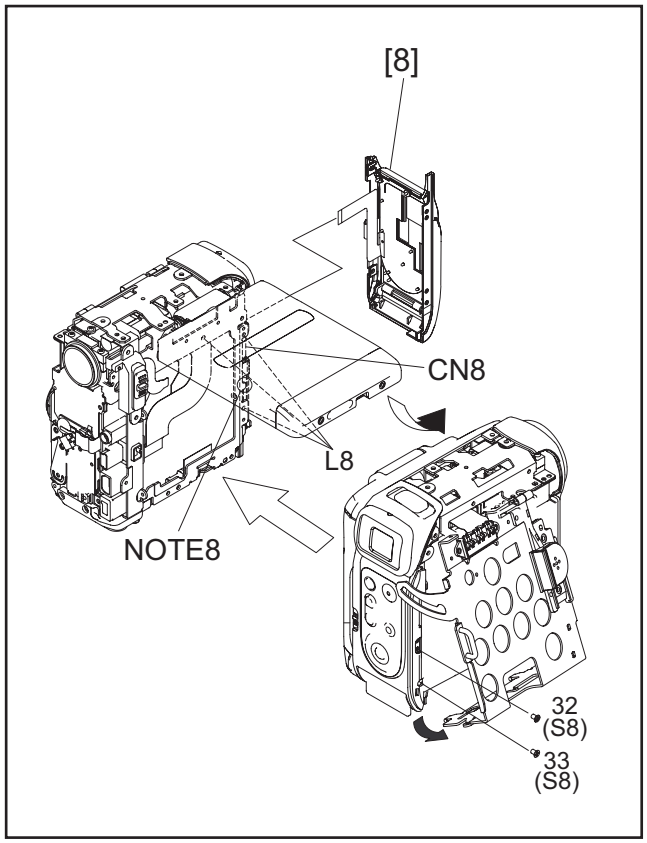


Fig.C6

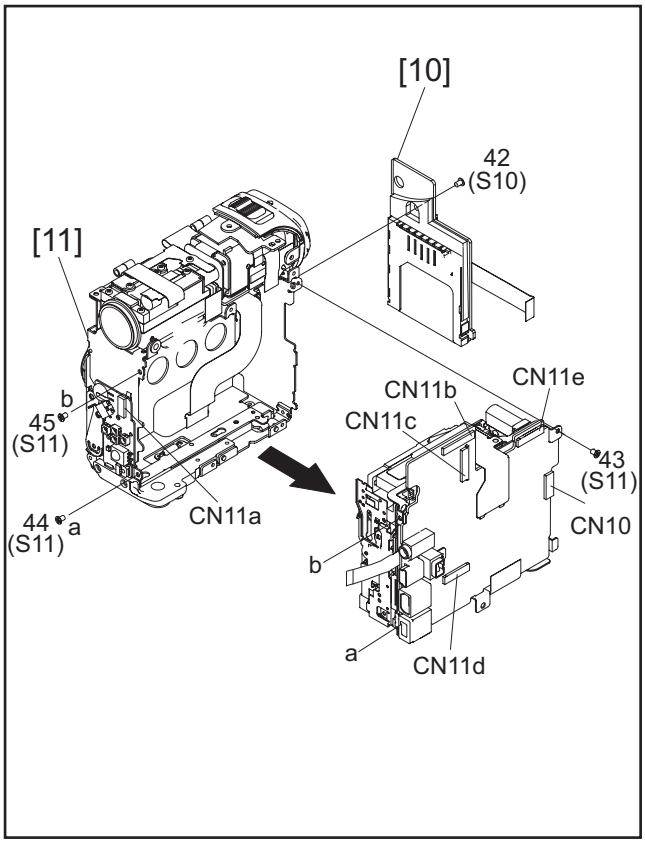


Fig.C8

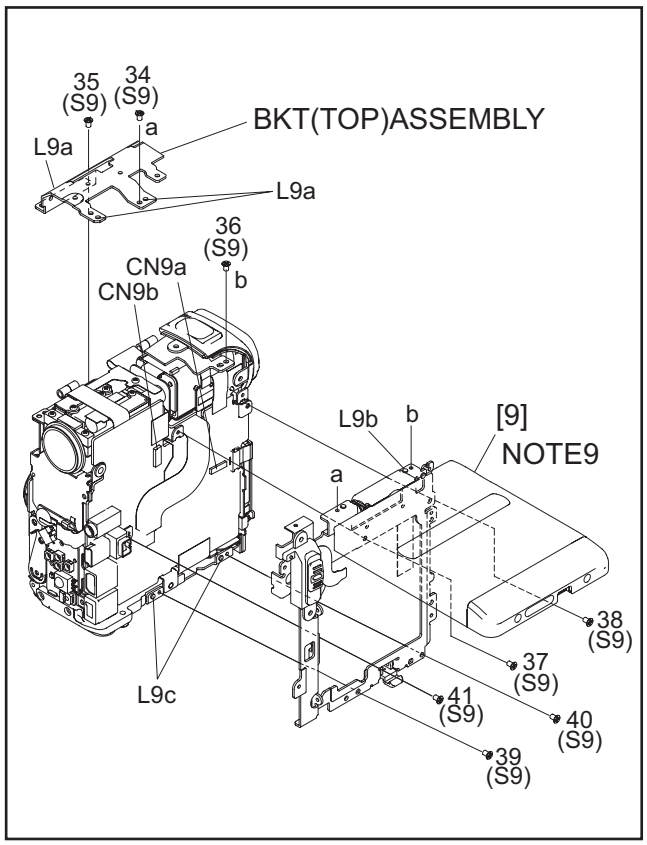


Fig.C7

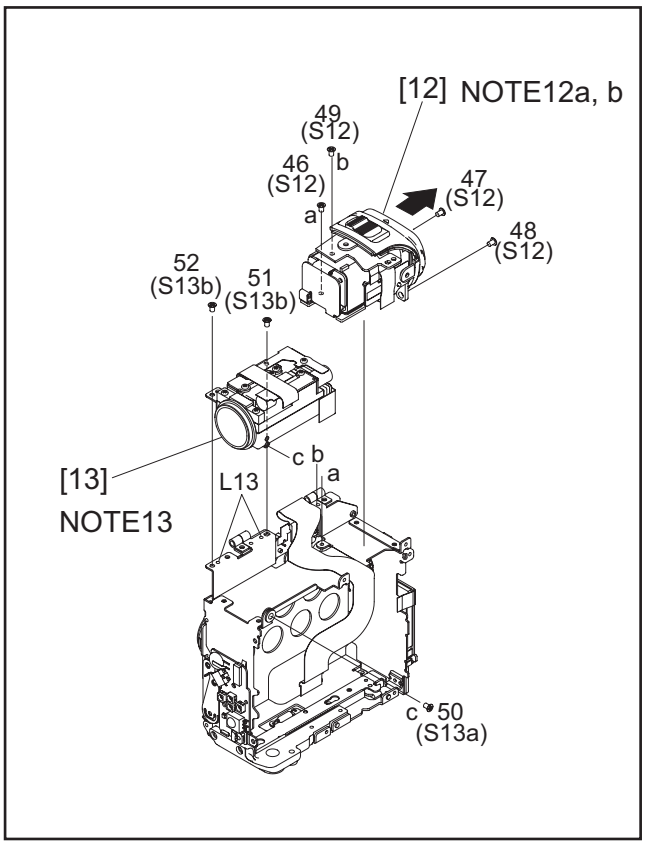


Fig.C9

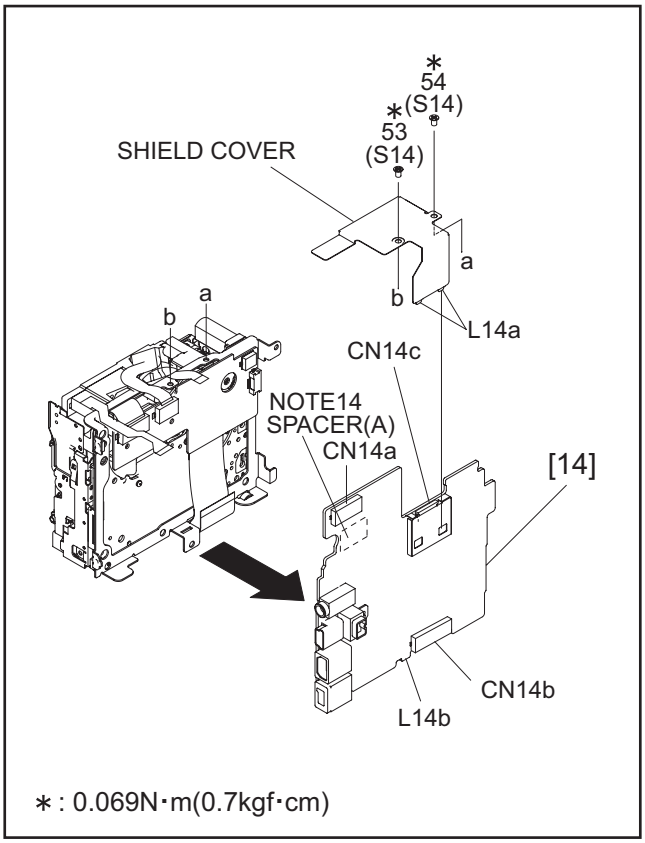


Fig.10

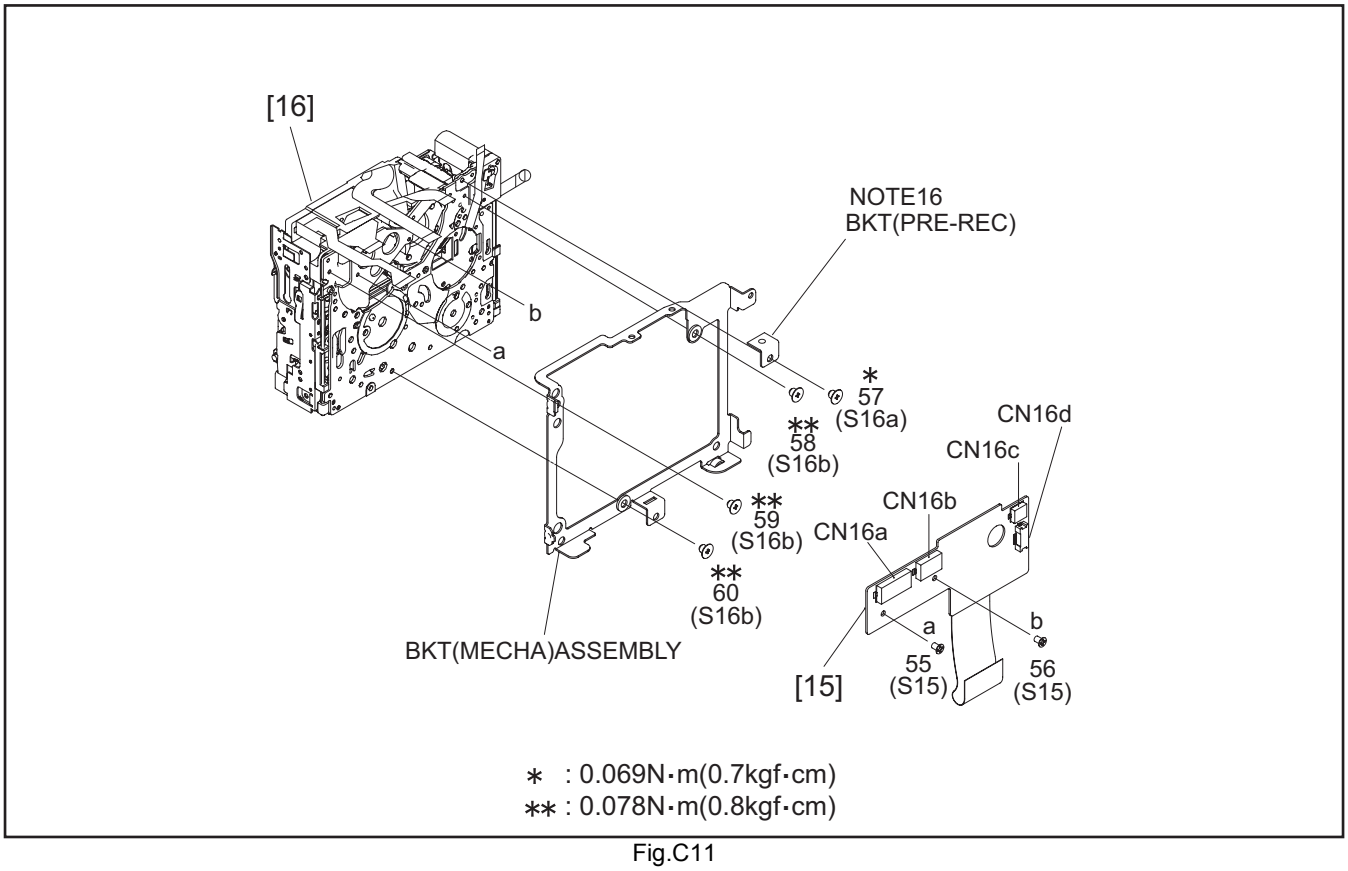


Fig.C11

3.2.3 DISASSEMBLY of [9] MONITOR ASSEMBLY

●CAUTIONS

(1) During the procedure, be careful in handling the LCD MODULE,etc., especially not to damage or soil the monitor screen. If it is soiled with fingerprints, etc., gently clean it with chamois or the cleaning cloth.
(2) Since the BACKLIGHT is soldered to the BOARD ASSEMBLY (SD9), the BACKLIGHT should not be separated from the BOARD ASSEMBLY except when replacing the BACKLIGHT.
(3) Remove the POWER (OPE) UNIT if necessary.

●Disassembly

(1) Remove the three screws (1-3) so that the FPC moves easily.
(2) Remove the two screws (4 and 5), and remove the MONITOR ASSEMBLY from the FRAME (UP) ASSEMBLY.
(3) While removing the five screws (6-10) in numerical order and disengaging the two hooks (L9a and L9b) in alphabetical order, remove the MONITOR COVER ASSY.
(4) Remove the SWITCH BOARD from the MONITOR CASE.
(5) Unlock the two connectors CN9a and CN9b, and raise and remove the HINGE UNIT ASSEMBLY.

NOTE9a:
During the procedure, be careful in handling the FPC ASSEMBLY.

(6) Unlock one connector CN9c, and remove the FPC.
(7) Remove one screw (11), and remove the MONITOR BOARD ASSEMBLY together with the BACKLIGHT.
(8) Remove the LCD BRACKET (2).
(9) Remove the LCD MODULE.
(10) Remove the LCD BRACKET (1).

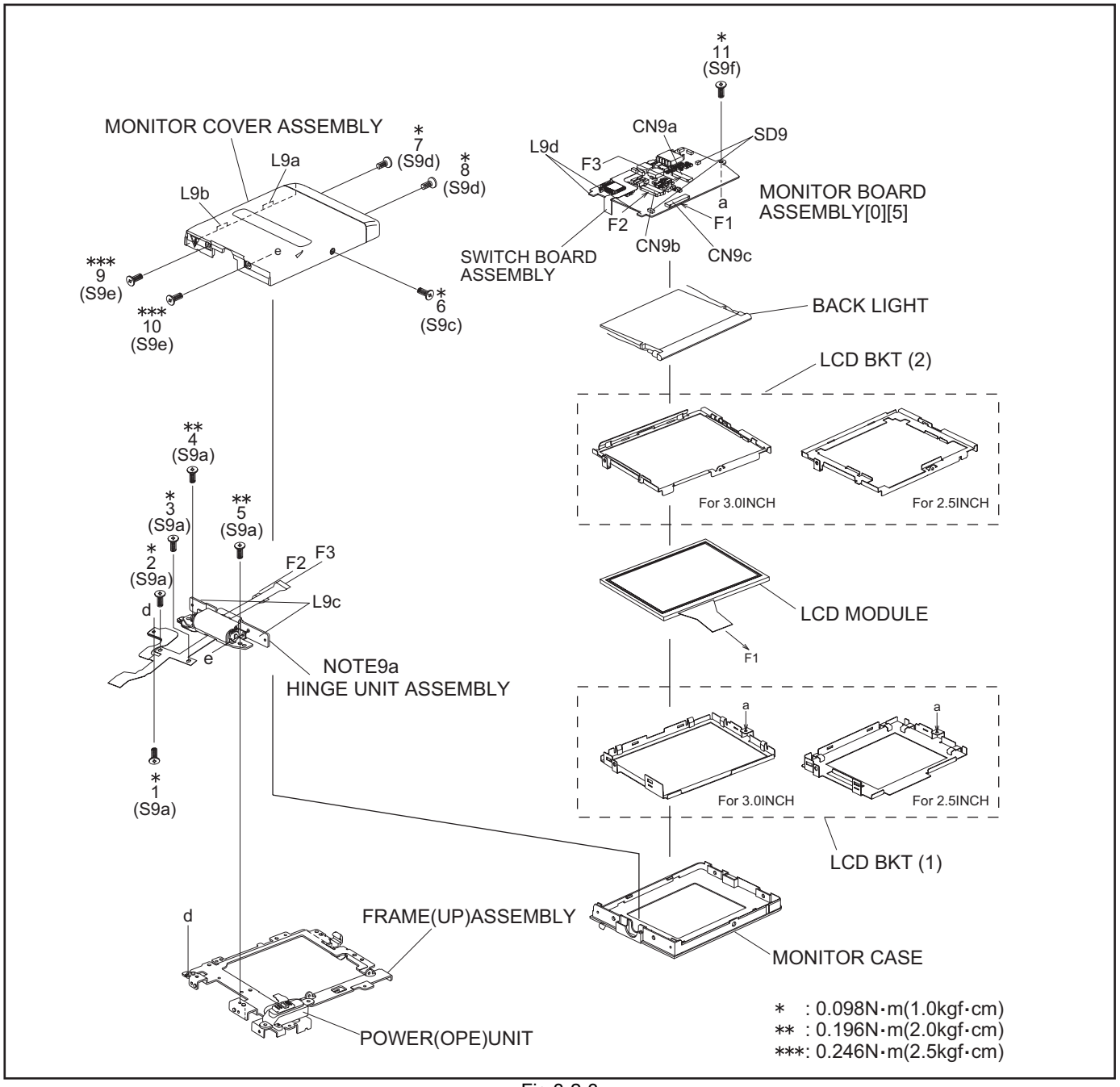


Fig.3-2-3

3.2.4 DISASSMBLY of [12] VF ASSEMBLY

●**Disassembly**

(1) Remove the EYE CUP.

NOTE12a:

After the EYE CUP is removed, be careful of handling the EYE CUP since the SHEET (LENS) is removed.

NOTE12b:

In attaching the EYE CUP, be careful of the attachment direction of the SHEET (LENS).

(2) Remove the three screws (1-3) and remove the HOLDER (EYE).

(3) Remove one screw (4) and remove the BRACKET (TOP2).

(4) Remove the two screws (5 and 6), lift the VF COVER in a direction of arrow, and remove the VF COVER from the ZOOM UNIT.

(5) Remove the FPC from one connector (CN12a), remove one screw (7), and remove the ZOOM UNIT.

(6) Remove the two screws (8 and 9), and remove the BRACKET.

(7) Remove the FPC attached to the GUIDE (OUTER) little by little so that the FPC moves easily, and remove the COVER (VF) from the GUIDE (OUTER).

NOTE12c:

Be careful enough not to cut or damage the removed FPC since the FPC is attached again.

NOTE12d:

Disassemble the COVER (VF) if necessary. In an attachment procedure, confirm that the LEVER (1) moves smoothly.

(8) Remove the two screws (10 and 11), and remove the FRAME ASSEMBLY.

(9) Remove the SPACER (A), and remove the FPC from one connector (CN12b).

(10) Remove the two screws (12 and 13), and remove the VF BOARD ASSEMBLY.

NOTE12e:

Disassemble the FRAME ASSEMBLY if necessary. In an assembly procedure, be careful not to insert foreign materials inside the VF and not to soil the VF.

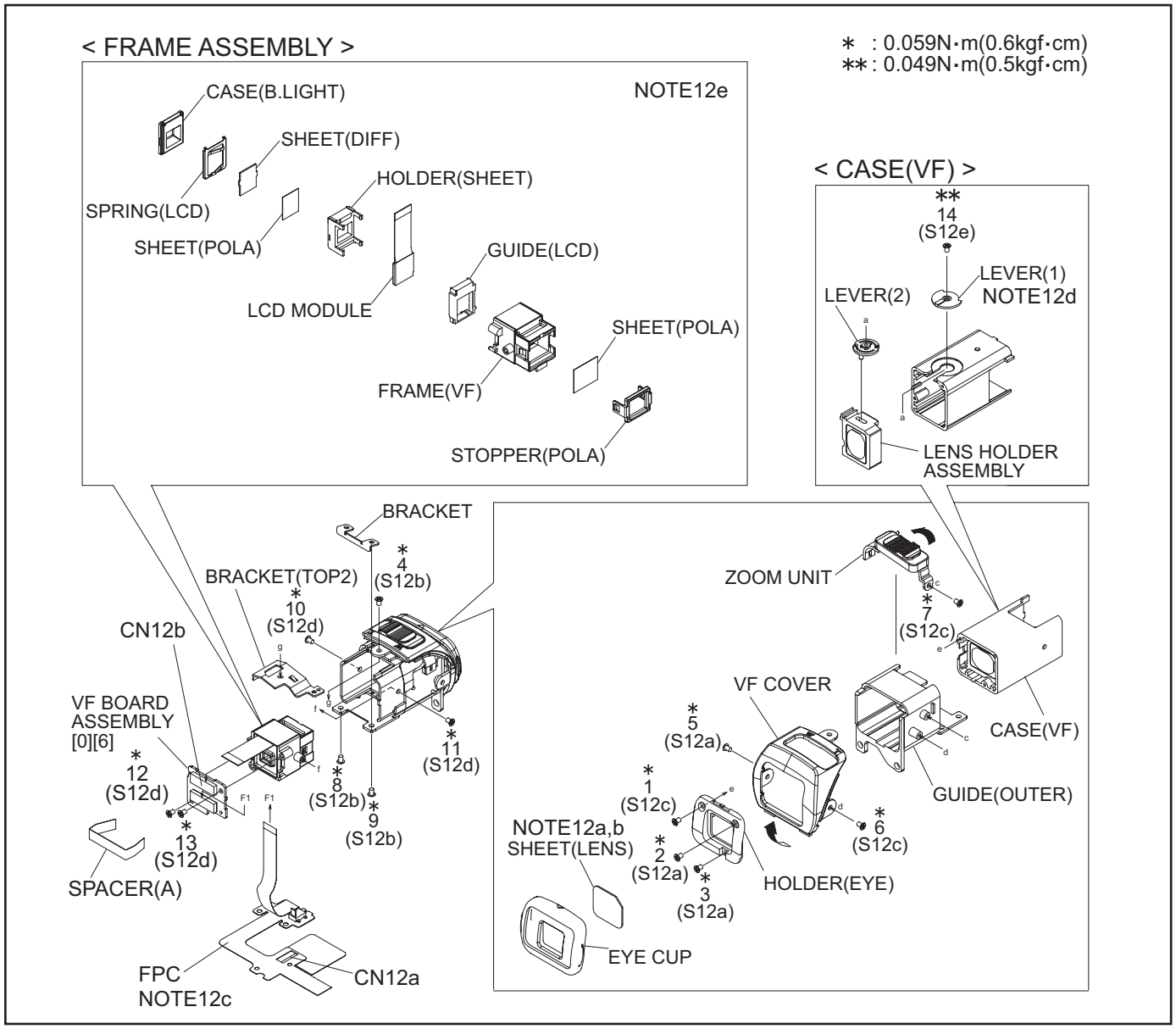


Fig.3-2-4

3.2.5 DISASSEMBLY of [13] OP BLOCK ASSEMBLY/CCD BOARD ASSEMBLY

●CAUTIONS

(1) Be careful in handling the CCD image sensor, OP LPF, and lens etc., especially not to damage or soil their surface.
If it is soiled with fingerprints, etc., gently clean it with chamois or the cleaning cloth.

(2) When the CCD image sensor is shipped from the factory, there are protection seals applied onto the transparent glass. Leave the protector as it is, and take it off just before assembling the CCD image sensor to the OP block.

●Disassembly

(1) Remove the two screws (1 and 2), and remove the CCD BOARD ASSEMBLY together with CCD BASE ASSEMBLY.

(2) Remove the LOW PASS FILTER HOLDER from the CCD BASE ASSEMBLY, and remove the MASK.

NOTE 13a:

Since the MASK is between the LOW PASS FILTER HOLDER and CCD IMAGE SENSOR, be careful in handling the MASK.

NOTE13b:

In removing the CCD IMAGE SENSOR, unsolder the fourteen soldered parts (SD13a), and remove the CCD BASE ASSEMBLY from the CCD BOARD ASSEMBLY.
In replacing the CCD IMAGE SENSOR, don't remove the CCD IMAGE SENSOR from the CCD BASE ASSEMBLY. Instead, replace the whole CCD BASE ASSEMBLY.

NOTE13c:

Since the OP LPF is inside the LOW PASS FILTER HOLDER and the OP LPF is attached to the LOW PASS FILTER HOLDER by using the SHEET, remove the OP LPF from the LOW PASS FILTER HOLDER if necessary.
In removing the OP LPF from the LOW PASS FILTER HOLDER, be careful not to damage the LOW PASS FILTER HOLDER, and remove the SHEET carefully if you want to use the same SHEET in attachment procedure.

NOTE13d:

In removing the OP LPF, be careful of the direction of its attachment. Since one side of the OP LPF is coated for the purpose of protection, attach the OP LPF so that the coated side faces the OP lens (a subject of photograph).

●Replacement of service repair parts

Service repair parts of the OP BLOCK ASSEMBLY are as follows.
When replacing the parts, be careful not to cut or damage the FPC, and not to damage the parts due to soldering (overheat).

(1) FOCUS MOTOR
(2) ZOOM MOTOR
(3) IRIS MOTOR

NOTE 13e:

When replacing the FOCUS MOTOR or the ZOOM MOTOR, lift the FPC approx.1mm away from the jack in soldering the FPC (SD13b).

NOTE13f:

IRIS MOTOR contains the FPC ASSEMBLY and the SENSOR ×2.

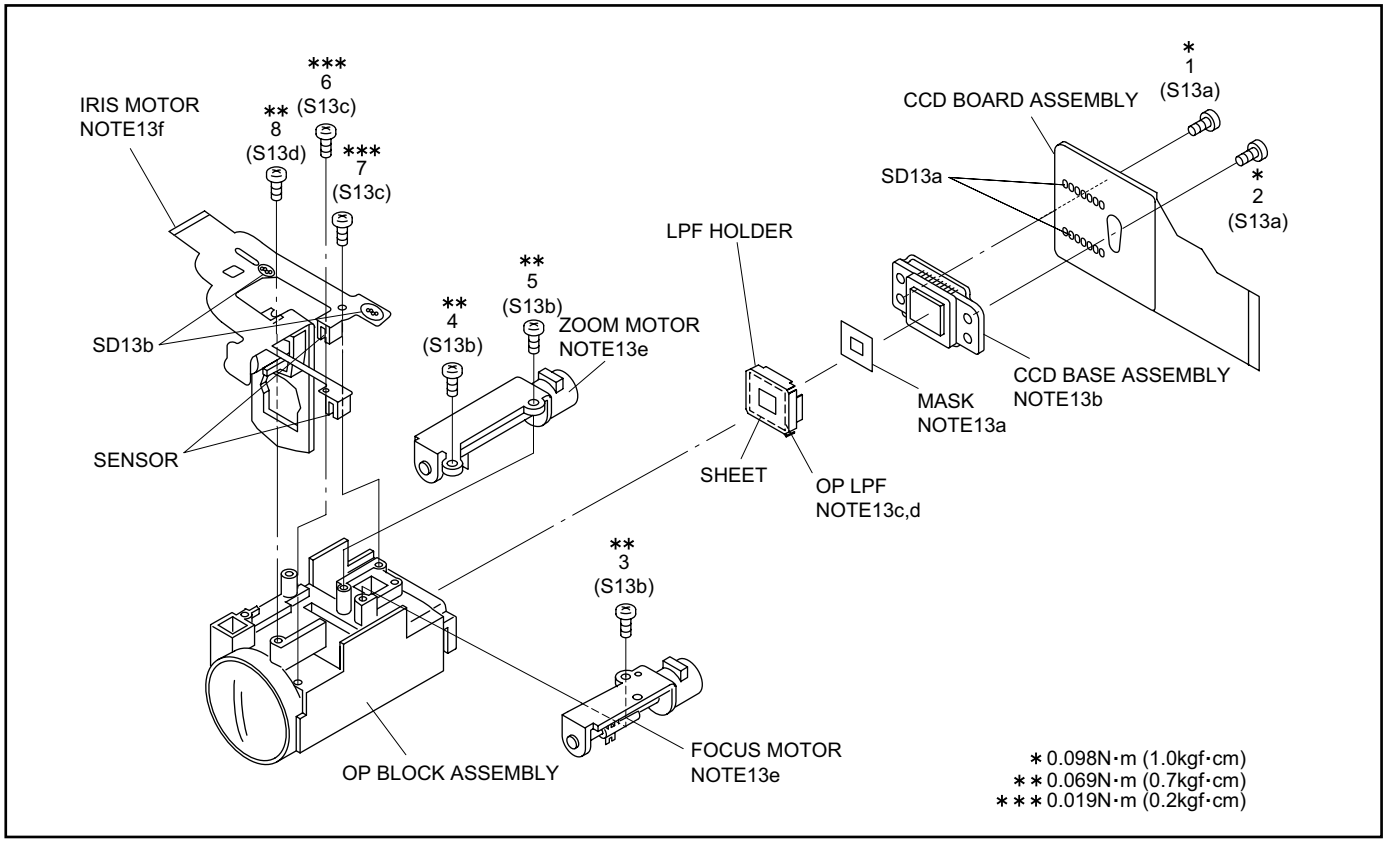


Fig.3-2-5

SECTION 4
ADJUSTMENT

4.1 PREPARATION

4.1.1 Precaution

Camera system and deck system of this model are specially adjusted by using PC.
However, if parts such as the following are replaced, an adjustment is required. The adjustment must be performed in a Service Center equipped with the concerned facilities.

- OP BLOCK ASSEMBLY
- EEP ROM (IC1005 of MAIN board)

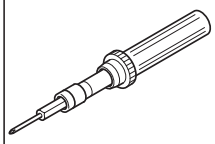
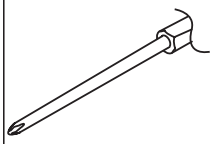
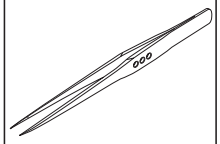
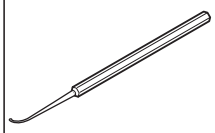
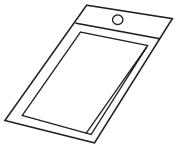
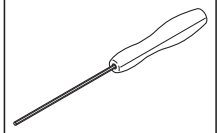
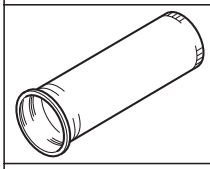
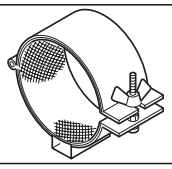
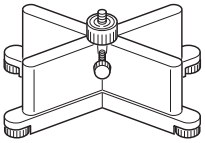
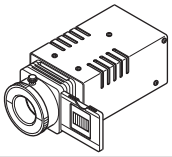
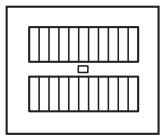
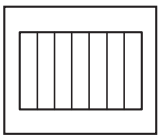
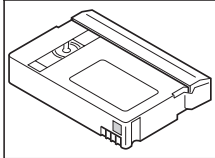
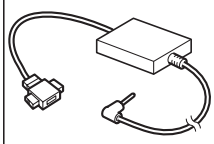
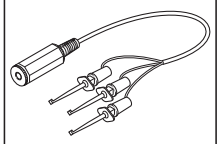
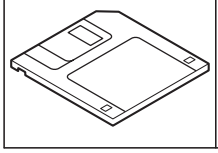
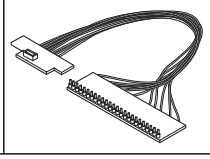
In the event of malfunction with electrical circuits, first find a defective portion with the aid of proper test instruments as shown in the following electrical adjustment procedure, and then commence necessary repair/ replacement/adjustment.

- In observing chip TP, use IC clips, etc. to avoid any stress. Prior to replacement of chip parts (especially IC), remove the solder completely to prevent peeling of the pattern.
- Use a patch cord if necessary. As for a patch cord, see the BOARD INTERCONNECTIONS.
- Since connectors are fragile, carefully handle them in disconnecting and connecting the FPC.

4.1.2 REQUIRED TEST EQUIPMENT

- Personal computer (for Windows)
- Color TV monitor
- Oscilloscope (dual-trace type, observable 100MHz or higher frequency). The one observable 300 MHz or higher frequency is recommended.
- Digital voltmeter
- DC power supply or AC adapter
- Frequency counter (with threshold level adjuster)

4.1.3 TOOLS REQUIRED FOR ADJUSTMENT

Torque Driver YTU94088	Bit YTU94088-003	Tweezers P-895
		
Chip IC Replacement Jig PTS40844-2	Cleaning Cloth KSMM-01	Guide Driver (Hexagonal) D-770-1.27
		
INF Adjustment Lens YTU92001B	INF Adjustment Lens Holder YTU94087	Camera Stand YTU93079
		
Light box Assembly YTU93096A	Gray Scale Chart YTU94133A	Color Bar Chart YTU94133C
		
Alignment Tape MC-1	PC Cable QAM0099-002	Communication Cable YTU93107A
		
Service Support System YTU94057-80	Jig Connector Cable YTU93106C	Extension Connector YTU94145D-40
		

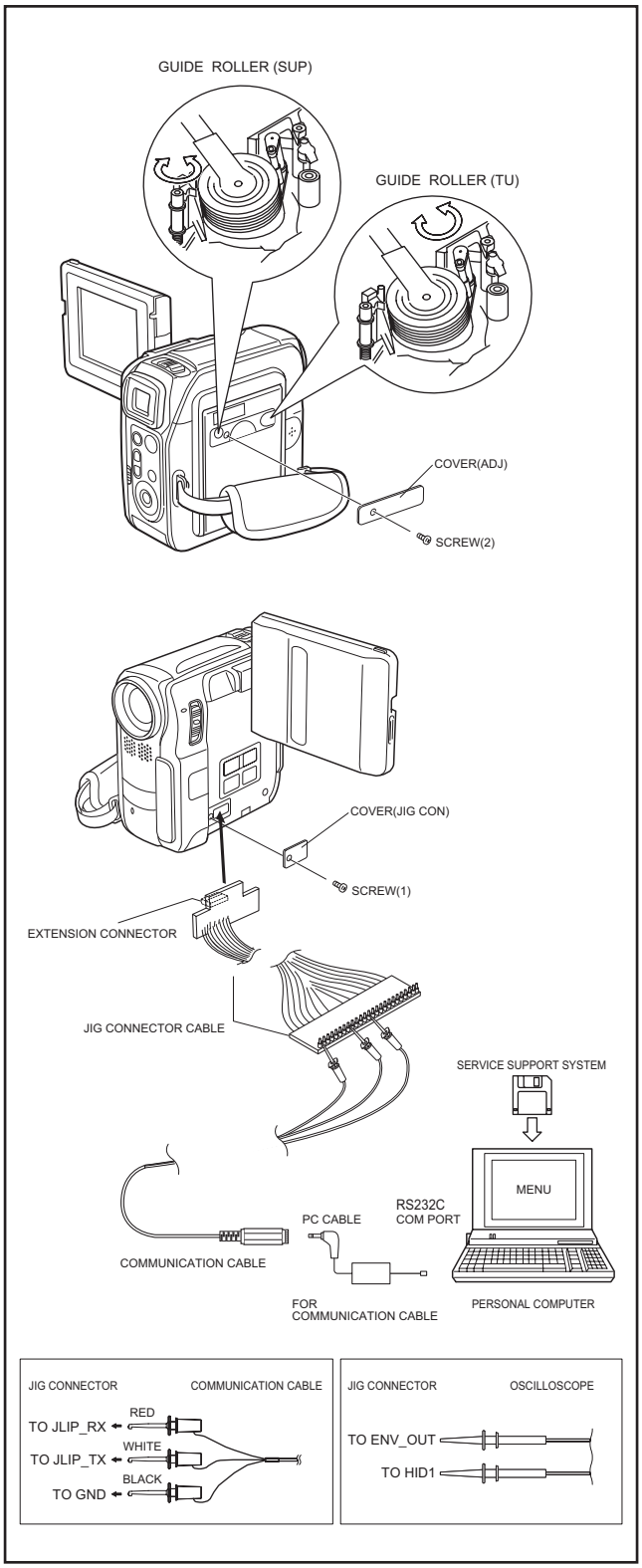
- **Torque driver**
  Be sure to use to fastening the mechanism and exterior parts because those parts must strictly be controlled for tightening torque.
- **Bit**
  This bit is slightly longer than those set in conventional torque drivers.
- **Tweezers**
  To be used for removing and installing parts and wires.
- **Chip IC replacement jig**
  To be used for adjustment of the camera system.
- **Cleaning cloth**
  Recommended the Cleaning cloth to wipe down the video heads, mechanism (tape transport system), optical lens surface.

- **Guide driver (Hexagonal)**
  To be used to turn the guide roller to adjustment of the linarity of playback envelope.
- **INF adjustment lens**
  To be used for adjustment of the camera system. For the usage of the INF adjustment lens, refer to the Service Bulletin No. YA-SB-10035.
- **INF lens holder**
  To be used together with the Camera stand for operating the Videocamera in the stripped-down condition such as the status without the exterior parts or for using commodities that are not yet conformable to the interchangeable ring. For the usage of the INF lens holder, refer to the Service Bulletin No. YA-SB-10035.
- **Camera stand**
  To be used together with the INF adjustment lens holder. For the usage of the Camera stand, refer to the Service Bulletin No. YA-SB-10035.
- **Light box assembly**
  To be used for adjustment of the camera system. For the usage of the Light box assembly, refer to the Service Bulletin No. YA-SB-10035.
- **Gray scale chart**
  To be used for adjustment of the camera system. For the usage of the INF adjustment lens, refer to the Service Bulletin No. YA-SB-10035.
- **Color bar chart**
  To be used for adjustment of the camera system. For the usage of the INF adjustment lens, refer to the Service Bulletin No. YA-SB-10035.
- **Alignment tape**
  To be used for check and adjustment of interchangeability of the mechanism.
- **PC cable**
  To be used to connect the Videocamera and a personal computer with each other when a personal computer issued for adjustment.
- **Communication cable**
  Connect the Communication cable between the PC cable and Jig connector cable when performing a PC adjustment.
- **Service support system**
  To be used for adjustment with a personal computer. Software can be downloaded also from JS-net.
- **Jig connector cable**
  Connected to JIG CONNECTOR of the main board and used for electrical adjustment, etc.
- **Extension connector**
  Connect this extension connector to the connector of the Jig connector cable for extending the cable connector.

4.2 JIG CONNECTOR CABLE CONNECTION

- Remove one screw (1), and remove the COVER (JIG CON).
- As the figure shows, insert JIG CONNECTOR CABLE in JIG CONNECTOR by using the EXTENSION CONNECTOR so that the wire side faces downward.

■ **Connection procedure**



■ **Jig connector diagrams**

JIG CONNECTOR CABLE (YTU93106C)

MAIN CN105

EXMOD_1	1		
MMOD_0		21	
MMOD_1	2		
I_MTR		22	
MONI_CHG	3		
NC		23	
RESET	4		
AL_3VSYS		24	
IF_TX	5		
JLIP_TX		25	
JLIP_RX	6		
TMS_DSC		26	
TCK_DSC	7		
TDI_DSC		27	
TRST_DSC	8		
TDO_DSC		28	
PB_CLK	9		
ENV_OUT		29	
MAIN_VCO	10		
ATFI		30	
HID1	11		
DISCRI		31	
FS_PLL	12		
TXD2		32	
SPA	13		
SBE		33	
RXD2	14		
GND		34	
GND	15		
V_OUT		35	
VCOM_M	16		
CVF_B		36	
CVF_R	17		
CVF_G		37	
HD_M	18		
VCOM_E		38	
NC	19		
EMU1		39	
NC	20		
MVD		40	

NOTE :
The JIG CONNECTOR BOARD uses 30 of the 40 pins of the MAIN BOARD. 10 Pins (1 to 5, 21 to 24 and 34) on the JIG CONNECTOR BOARD on the Main board are NC.

JIG CONN. BOARD (PIN NO.)

6	JLIP_RX
7	TCK_DSC
8	TRST_DSC
9	PB_CLK
10	MAIN_VCO
11	HID1
12	FS_PLL
13	SPA
14	RXD2
15	GND
16	VCOM_M
17	CVF_R
18	HD_M
19	NC
20	NC
25	JLIP_TX
26	TMS_DSC
27	TDI_DSC
28	TDO_DSC
29	ENV_OUT
30	ATFI
31	DISCRI
32	TXD2
33	SBE
35	V_OUT
36	CVF_B
37	CVF_G
38	VCOM_E
39	EMU1
40	MVD

4.3 MECHANISM COMPATIBILITY ADJUSTMENT

4.3.1 Tape pattern adjustment

NOTE:

Prior to the adjustment, remove the COVER (ADJ).

(1) Play back the compatibility adjustment tape.
(2) While triggering the HID1, observe the waveform of ENV_OUT.
(3) Set the manual tracking mode (ATF OFF).
(4) Confirm that the waveform is entirely parallel and straight, and free from remarkable level-down, through the tracking operation.
Make the confirmation as follows if necessary.
(5) If level-down is observed on the left hand side of the waveform, straighten the level by turning the GUIDE ROLLER (SUP).
If level-down is observed on the right hand side of the waveform, straighten the
level by turning the GUIDE ROLLER (TU).
(6) After the adjustment, try the unloading motion once, and confirm that the waveform is flat when the tape has been played back again.
(7) Play back the self-recording.
(8) Confirm that the waveform is flat.

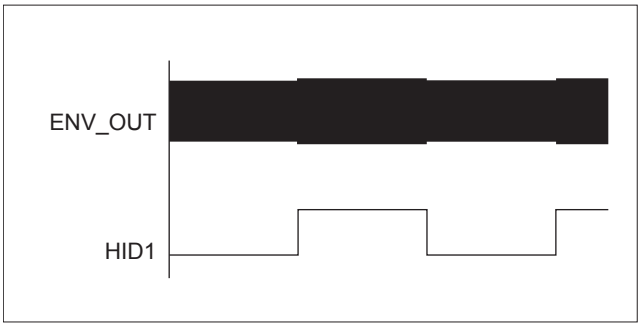


Fig.4-3-1

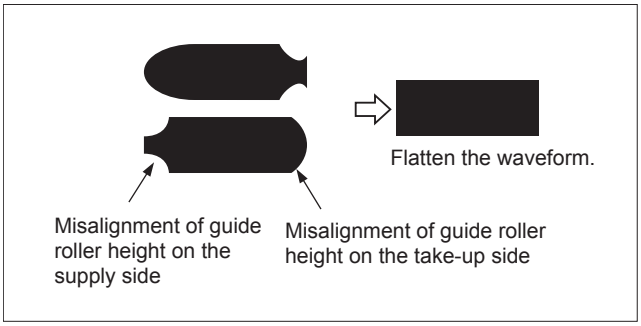

Flatten the waveform.
Misalignment of guide roller height on the supply side
Misalignment of guide roller height on the take-up side

Fig.4-3-2

4.4 ELECTRICAL ADJUSTMENT

Electrical adjustment is performed by using a personal computer and software for SERVICE SUPPORT SYSTEM. Read README.TXT file to use the software properly.
As for the connection of cables, see "4.2 JIG CONNECTOR CABLE CONNECTION".

CABINET PARTS AND ELECTRICAL PARTS

Symbol No.	[1]							[2]		[3]		[4]								[5]				
Removing order of screw	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Place to stick screw	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			*	*	*	*	*
Reference drawing (Fig.No.)	C1							C2				C3								C4				
Screw tightening torque	I																			II				

CABINET PARTS AND ELECTRICAL PARTS

Symbol No.	[6]					[7]		[8]		[9]								[10]	[11]		
Removing order of screw	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Place to stick screw	*	*	*	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*
Reference drawing (Fig.No.)	C5							C6		C7								C8			
Screw tightening torque	I																				

CABINET PARTS AND ELECTRICAL PARTS

Symbol No.	[12]				[13]			[14]		[15]		[16]			
Removing order of screw	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Place to stick screw	*	*	*	*		*	*								
Reference drawing (Fig.No.)	C9							C10		C11					
Screw tightening torque	I							III		I		III	II		

[9] MONITOR ASSEMBLY

Removing order of screw	1	2	3	4	5	6	7	8	9	10	11
Place to stick screw	*	*	*	*	*						
Reference drawing (Fig.No.)	3-2-3										
Screw tightening torque	IV			V		IV			VI		IV

[12] VF ASSEMBLY

Removing order of screw	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Place to stick screw														
Reference drawing (Fig.No.)	3-2-4													
Screw tightening torque	VIII													IX

[13] OP BLOCK ASSEMBLY / CCD BOARD ASSEMBLY

1	2	3	4	5	6	7	8
3-2-5							
IV		III			VII		

NOTE:

1) * : Don't reuse the screw, because screw lock bond was applied to them.
2) Pay careful attention to tightening torque for each screw.

I : 0.088N·m (0.9kgf·cm)
II : 0.078N·m (0.8kgf·cm)
III : 0.069N·m (0.7kgf·cm)
IV : 0.098N·m (1.0kgf·cm)
V : 0.196N·m (2.0kgf·cm)
VI : 0.246N·m (2.5kgf·cm)
VII : 0.019N·m (0.2kgf·cm)
VIII : 0.059N·m (0.6kgf·cm)
IX : 0.049N·m (0.5kgf·cm)

5.2 TAKE OUT CASSETTE TAPE

The following procedure is a method for taking out the cassette tape in case the cassette tape cannot be ejected due to an electrical failure. The following procedure is a simplified method; therefore, for more reliable operation, it is recommended that you should remove exterior parts so that you can take out the tape without excessive force.

(1) Remove the Power Unit (battery or DC cord) from the set.
(2) Open the CASSETTE COVER till it is completely opened and fixed.
(3) Attach a PVC tape as shown in the figure.

NOTE:
Be careful of cassette tape damage caused because the Cassette Housing Assembly is moved upward at the unloading end (Eject mode).

(4) To set the Slide Deck Assembly to the unloading end, apply DC 3V to the electrode (terminal) on the top surface of the LOADING MOTOR that is seen through a space of VF side.

NOTE:
Be careful not to attach grease or a similar substance to the surface of the cassette tape on the tape transport system.

(5) Wind the cassette tape by directly turning the Reel Disk Assembly (SUP) from the backside of the SLIDE DECK ASSEMBLY by using a sharp tool (Chip IC replacement tool).
(6) Confirm that the cassette tape is completely wound, and then peel off the PVC tape from the CASSETTE HOUSING ASSEMBLY and take out the cassette tape.

NOTE:
To confirm that the cassette tape is completely wound, confirm that one REEL DISK ASSEMBLY (TU) rotates as you rotate the other REEL DISK ASSEMBLY (SUP).

(7) Make sure that grease or a similar substance is not attached to the surface of the tape taken out in the procedure (6). Similarly, also make sure that grease or a similar substance is not attached on the MECHANISM ASSEMBLY, especially the tape transport system.

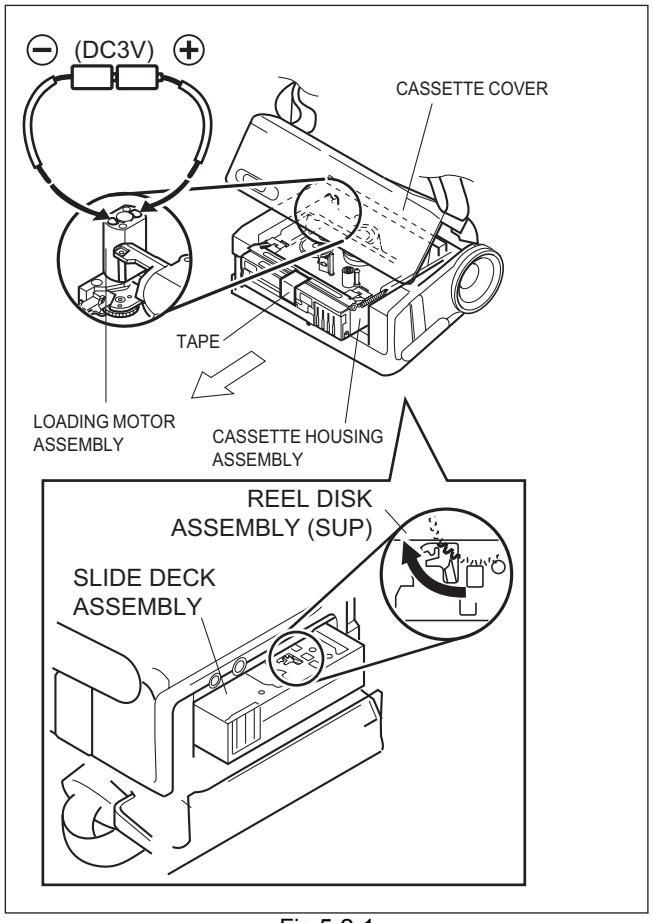


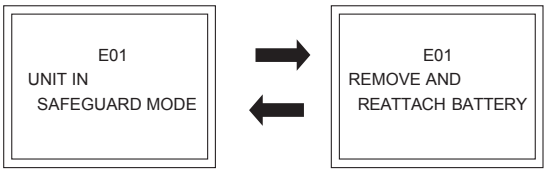
Fig.5-2-1

5.3 EMERGENCY DISPLAY

Whenever some abnormal signal is input to the syscon CPU, an error number (E01, as an example) is displayed on the LCD monitor or (in the electronic view finder).In every error status, such the message as shown below alter nately appear over and over.

- In an emergency mode, all operations except turning on/off the POWER switch are ineffectual.

Example (in case of the error number E01):



LCD display	Emergencymode	Details	Possible cause
E01	LOADING	In the case the encoder position is not shifted to the next point though the loading motor has rotated in the loading direction for 4 seconds or more. This error is defined as [E01].	1. The mechanism is locked during mode shift. 2. The mechanism is locked at the mechanism loading end, because the encoder position is skipped during mechanism mode shift. 3. No power is supplied to the loading MDA.
E02	UNLOADING	In the case the encoder position is not shifted to the next point though the loading motor has rotated in the unloading direction for 4 seconds or more. This error is defined as [E02].	1. The mechanism is locked during mode shift. 2. The mechanism is locked at the mechanism loading end, because the encoder position is skipped during mechanism mode shift.
E03	TU & SUP REEL FG	In the case no REEL FG is produced for seconds shown in the table below or more in the capstan rotation mode after loading was complete, the mechanism mode is shifted to STOP with the pinch roller set off. This error is defined as [E03].However, no REEL EMG is detected in the SLW/STILL mode. REEL(SUP) / REEL(TU) PB/REC: 3 SEC / 3 SEC S-FWD: 3 SEC / 0.3 SEC S-REW: 0.3 SEC / 3 SEC FF: 3 SEC / 0.1 SEC REW: 0.1 SEC / 3 SEC	1. The idler gear does not engage with the reel disk well. 2. Though the idler gear and reel disk are engaged with each other, the tape is not wound because of overload to the mechanism. 3. No FG pulse is output from the reel sensor. 4. No power is supplied to the reel sensor. 5. Tape transport operation takes place with a cassette having no tape inside. 6. The tape slackens and no pulse is produced until the slack is taken up and the tape comes into the normal status.
E04	DRUM FG	In the case there is no DRUM FG input in the drum rotation mode for 4 seconds or more. This error is defined as [E04], and the mechanism mode is shifted to STOP with the pinch roller set off.	1. The drum cannot be started or drum rotation is stopped because tape transport load is too high. 1) Tape tension is extremely high. 2) The tape is damaged or soiled with grease, etc. 2. The DRUM FG signal is not received by the syscon CPU. 1) Disconnection in the middle of the signal line. 2) Failure of the DRUM FG pulse generator (hall element). 3. No drum control voltage is supplied to the MDA. 4. No power is supplied to the DRUM MDA.
E05	-	-	-
E06	CAPSTAN FG	In the case no CAPSTAN FG is produced in the capstan rotation mode for 2 seconds or more. This error is defined as [E06], and the mechanism mode is shifted to STOP with the pinch roller set off.However, no CAPSTAN EMG is detected in the STILL/FF/REW mode.	1. The CAPSTAN FG signal is not received by the syscon CPU. 1) Disconnection in the middle of the signal line. 2) Failure of the CAPSTAN FG pulse generator (MR element). 2. No capstan control voltage is supplied to the MDA. 3. The capstan cannot be started or capstan rotation is stopped because tape transport load is too high. 1) Tape tension is extremely high. (Mechanical locking) 2) The tape is damaged or soiled with grease, etc. (Tape tangling occurs, etc.)

Fig.5-3-1

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